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*Case Report Article*

# CBCT findings in a case of triple mental foramina: a rare anatomic variation

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## Abstract

**Introduction:** The mental foramen is located bilaterally on the anterior surface of the mandible. It serves as a reference point in the anesthetic technique used for blocking the mental nerve. It is important in planning implant placement and other surgical procedures in the region, to avoid damaging the mental vascular-nervous bundle. **Case report:** The present study presents a case of unilateral triple mental foramina, an anatomical variation with low incidence (0.7% to 1.2%), found incidentally in a cone beam computed tomography examination. **Conclusion:** despite the low incidence of the triple mental foramina, dentists must be aware of this anatomical variation to avoid complications during procedures.

## Introduction

Present bilaterally present in the mandible, the mental neurovascular bundle passes through the mental foramen (MF), and innervates the soft tissues of the lower lip and chin, lower anterior teeth and adjacent structures. The MF provides a reference point in the anesthetic technique used for blocking the mental nerve. It is also important in planning dental surgical procedures to avoid damage to the neurovascular bundle [13].

The MF corresponds to the opening in the vestibular cortex of the mandibular body, close to the premolars of the mandibular canal (MC). Studies show variations in its exact position, which may vary in height in relation to the base of the jaw, position in relation to the teeth, and its shape [3, 5, 6, 10]. According to a study by Budhiraja et al. [2], where 105 dry adult mandibles were evaluated, the most commonly observed position of the MF was on the longitudinal axis of the second premolar (61% on the right side and 59.1% on the left side)

and, in the majority (74.3%), the foramina were oval. The second most observed position of the MF was between the first and second premolars (20% on the right side and 20.9% on the left side).

Accessory mental foramen (AMF) is an anatomical variation of the MF. The AMF communicates directly with the MC and allows the passage of to the accessory neurovascular bundle. Its incidence is variable and there is no established pattern with regard to age, size, and sex. There are studies in the literature showing that the incidence of the triple mental foramina ranges from 0.7% to 1.2% [1, 4, 8, 11-13].

The present study aims to report an unusual case of the unilateral triple mental foramina, found incidentally, in a cone beam computed tomography (CBCT) examination.

## Case report

This case report was approved by the research ethics committee of the Bauru School of Dentistry – University of São Paulo (CAAE: 33718820.7.0000.5417).

A 15-year-old male patient underwent a tomography examination at the radiology clinic of the Bauru School of Dentistry, USP, for third molar evaluation. The CBCT showed lower left third molar in the mandible, bone sclerosis in the apical region of lower left canine, single and bulky mental foramen on the right side, and a left triple mental foramen. The patient had previously undergone panoramic radiography (PAN) for orthodontic reasons, and it was not possible to observe the anatomical variation of the left foramen on the two-dimensional image (figure 1).

The triple foramina is found in the periapical region between first and second left lower premolars. The diameter of the main foramen is 1.21 mm and that of the accessories foraminas, one upper and one posteroinferior, are 0.72 mm and 0.97 mm, respectively. The single foramen on the right side has a diameter of 3.29 mm (figure 2).

In the coronal reconstruction of the CBCT, it is possible to observe the triple ramification of the mandibular canal, originating from the three foramina. The main is the most anterior, found on the axis of the first premolar, followed by the upper and posteroinferior accessories, located between the premolars (figure 3).

In the 3D reconstruction image, used for didactic purposes, it is possible to visualize the position of the three foramina (figure 4).

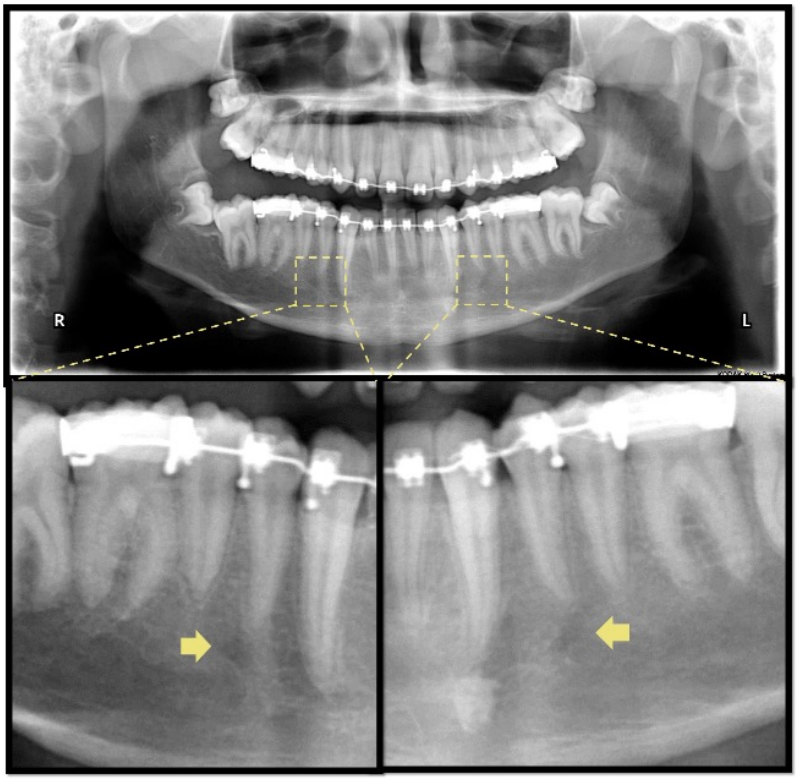


**Figure 1** – The panoramic radiograph shows the right and left mental foramen. Note it is not possible to observe the anatomical variation

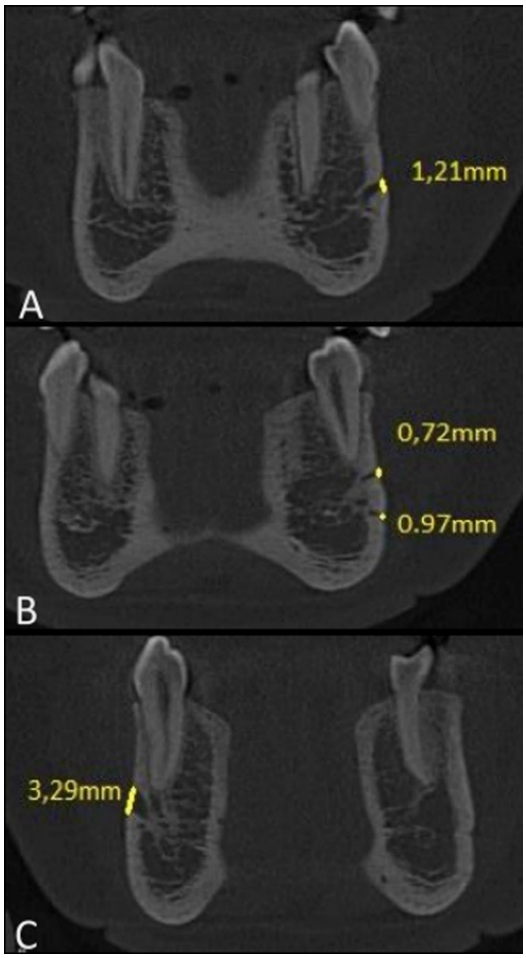


**Figure 2** – CBCT shows triple mental foramen on the left side: A) the main (1.21 mm); B) a superior (0.72 mm) and one posterior-inferior (0.97 mm); C) right mental foramen (3.29 mm)

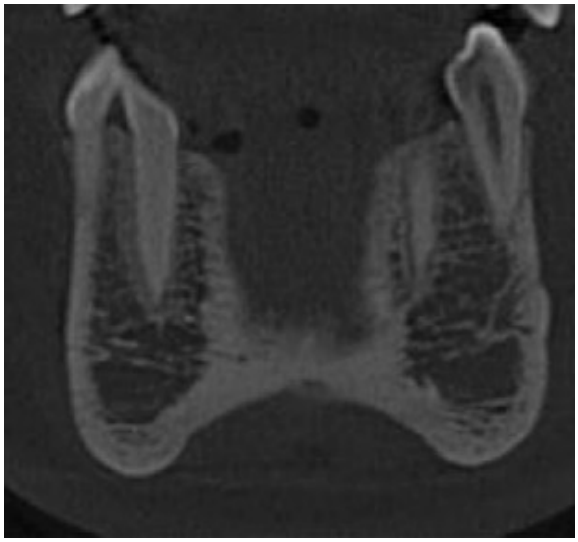

**Figure 3** – Coronal reconstruction of the CBCT where trifurcation of the mandibular canal is observed, giving rise to the three foramina

**Figure 4** – 3D reconstruction of the CBCT shows the triple foramen on the left side

## Discussion

The CBCT is considered the gold standard for identifying anatomical variations since it provides a higher image quality compared with two-dimensional imaging methods, such as PAN [13].

Incidence of AMF in different populations has been researched. Imada *et al.* [7] carried out a study on the Brazilian population where three (3%) out of 100 had double MF, two of which were unilateral and one bilateral. The results of this study also demonstrated the effectiveness of CBCT when compared to PAN in detecting variation. It was not possible to observe the AMFs in the PANs of these same patients. The present case agrees with these findings since the AMF could not be identified in the PAN, but was only possible to view it through the CBCT.

Zmyslowska-Polakowska *et al.* [13] evaluated the tomographic examination of 200 Polish patients. Twenty-eight double MFs (7%) were observed, eighteen in men and ten in women, but there was no statistically significant difference between the sexes. Further, 53.6% of the variation was on the right side, and no bilateral AMF was observed.

Out of 156 patients In the Iranian population, eight (5.1%) had the double MF anatomical variation, with six cases in men and two in women. There was no statistically significant difference between the sexes. The AMF was observed bilaterally in only one case [9].

Five hundred and five patients from the Turkish population were evaluated by Sisman *et al.* [12] and the incidence of AMF was observed in ten cases (2%). Only one (0.2%) had triple MF and the remaining had double (1.8%). Three were bilateral and seven unilateral: three were on the right side and four on the left side, including the triple foramina. Katakami *et al.* [8] evaluated the tomographic examination of 150 patients, and the results showed the presence of double MF in sixteen patients (10.6%) and unilateral triple MF in one patients (0.6%). A similar study in 2009, by Naitoh *et al.* [11], showed eleven cases (7%) of double MF and two cases (1.3%) of triple MF, in a total of 157 evaluated patients.

The case we presented was in a male patient, and the studies reported above did not find any statistically significant difference between the sexes; however, some showed results where the incidence of AMF was higher in males than in females [7, 12, 13]. In the present case, AMFs is subsequent to MF, a predominant characteristic in the studies of Katakami *et al.* [8] (59%) and Naitoh *et al.* [11] (60%). The AMFs were next to the MF, as reported in the case in question. Studies also report that the AMF usually has a size of less than 1.0 mm [1, 8] and the average diameter of the MF varies from 1.8 to 5.1 mm [7]. In the case presented, only the left MF diameter (1.21 mm) would be outside this average.

Despite the low incidence of the triple mental foramina, dentists must be aware of this anatomical variation to avoid complications during procedures. The CBCT has a relevant role in identifying the AMF.

## Conflict of interest

All authors declare that they have no conflict of interest.

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